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1

SEQUENCE LISTING

<110> Pharmexa A/S

<120> IMMUNIZATION AGAINST AUTOLOGOUS GHRELIN

<130> 15451PCT00

<160> 17

<170> PatentIn version 3.1

<210> 1

<211> 41

<212> PRT

<213> Artificial sequence

<220>

<223> Mature ghrelin fused to PADRE sequence

<400> 1

Gly Ser Ser Phe Leu Ser Pro Glu His Gln Lys Ala Gln Gln Arg Lys
1 5 10 15

Glu Ser Lys Lys Pro Pro Ala Lys Leu Gln Pro Arg Ala Lys Phe Val
20 25 30

Ala Ala Trp Thr Leu Lys Ala Ala Ala
35 40

<210> 2

<211> 41

<212> PRT

<213> Artificial sequence

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<223> Mature ghrelin with PADRE sequence inserted

<400> 2

Gly Ser Ser Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala
1 5 10 15

Phe Leu Ser Pro Glu His Gln Lys Ala Gln Gln Arg Lys Glu Ser Lys
20 25 30

Lys Pro Pro Ala Lys Leu Gln Pro Arg
35 40

<210> 3

<211> 41

<212> PRT

<213> Artificial sequence

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<223> Mature ghrelin with PADRE sequence inserted

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Gly Ser Ser Phe Leu Ser Pro Glu His Gln Lys Ala Lys Phe Val Ala
1 5 10 15

Ala Trp Thr Leu Lys Ala Ala Ala Ala Gln Gln Arg Lys Glu Ser Lys
20 25 30

Lys Pro Pro Ala Lys Leu Gln Pro Arg
35 40

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Gly Ser Ser Phe Leu Ser Ala Lys Phe Val Ala Ala Trp Thr Leu Lys
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Ala Ala Ala Pro Glu His Gln Lys Ala Gln Gln Arg Lys Glu Ser Lys
20 25 30

Lys Pro Pro Ala Lys Leu Gln Pro Arg
35 40

<210> 5

<211> 40

<212> PRT

<213> Artificial sequence

<220>

<223> Mature ghrelin with PADRE sequence substituted in

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Gly Ser Ser Phe Leu Ser Ala Lys Phe Val Ala Ala Trp Thr Leu Lys
1 5 10 15

Ala Ala Ala Glu His Gln Lys Ala Gln Gln Arg Lys Glu Ser Lys Lys
20 25 30

Pro Pro Ala Lys Leu Gln Pro Arg
35 40

<210> 6
<211> 13
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<213> Artificial sequence

<220>
<223> Pan DR binding peptide, PADRE

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Ala Lys Phe Val Ala Ala Trp Thr Leu Lys Ala Ala Ala
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<210> 7
<211> 15
<212> PRT
<213> Clostridium tetani

<400> 7

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu
1 5 10 15

<210> 8
<211> 21
<212> PRT
<213> Clostridium tetani

<400> 8

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser
1 5 10 15

Ala Ser His Leu Glu
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<210> 9
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<223> Ghrelin pre-propeptide

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<223> Mature ghrelin

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ctc agc atg ctc tgg atg gac atg gcc atg gca ggc tcc agc ttc ctg 99
Leu Ser Met Leu Trp Met Asp Met Ala Met Ala Gly Ser Ser Phe Leu
15 20 25

agc cca gag cac cag aaa gcc cag cag aga aag gaa tcc aag aag cca 147
Ser Pro Glu His Gln Lys Ala Gln Gln Arg Lys Glu Ser Lys Lys Pro
30 35 40

cca gct aaa ctg cag cca cga gct ctg gaa ggc tgg ctc cac cca gag 195
Pro Ala Lys Leu Gln Pro Arg Ala Leu Glu Gly Trp Leu His Pro Glu
45 50 55 60

gac aga gga caa gca gaa gag aca gag gag gag ctg gag atc agg ttc 243
Asp Arg Gly Gln Ala Glu Glu Thr Glu Glu Glu Leu Glu Ile Arg Phe
65 70 75

aat gct ccc ttc gat gtt ggc atc aag ctg tca gga gct cag tat cag 291
Asn Ala Pro Phe Asp Val Gly Ile Lys Leu Ser Gly Ala Gln Tyr Gln
80 85 90

cag cat ggc cgg gcc ctg ggg aag ttt ctt cag gat atc ctc tgg gaa 339
Gln His Gly Arg Ala Leu Gly Lys Phe Leu Gln Asp Ile Leu Trp Glu
95 100 105

gag gtc aaa gag gcg cca gct gac aag taa ccacggacag gcctgacccc 389
 Glu Val Lys Glu Ala Pro Ala Asp Lys
 110 115

cgtgctttcc ttctcctgag caagaactca catccgcctc agcctcctcg gcaactccca 449

gcactctcct accactttaa gaataaatgt tcacctgt 487

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 Met Pro Ser Pro Gly Thr Val
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tgc agc ctc ctg ctc ctc ggc atg ctc tgg ctg gac ttg gcc atg gca 102
 Cys Ser Leu Leu Leu Leu Gly Met Leu Trp Leu Asp Leu Ala Met Ala
 10 15 20

ggc tcc agc ttc ctg agc cct gaa cac cag aga gtc cag cag aga aag 150
 Gly Ser Ser Phe Leu Ser Pro Glu His Gln Arg Val Gln Gln Arg Lys
 25 30 35

gag tcg aag aag cca cca gcc aag ctg cag ccc cga gct cta gca ggc 198
 Glu Ser Lys Lys Pro Pro Ala Lys Leu Gln Pro Arg Ala Leu Ala Gly
 40 45 50 55

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tgg ctc cgc ccg gaa gat gga ggt caa gca gaa ggg gca gag gat gaa      246
Trp Leu Arg Pro  Glu Asp Gly Gly Gln Ala Glu Gly Ala Glu Asp Glu
              60              65              70

ctg gaa gtc cgg ttc aac gcc ccc ttt gat gtt gga atc aag ctg tca      294
Leu Glu Val Arg Phe Asn Ala Pro Phe Asp Val Gly Ile Lys Leu Ser
              75              80              85

ggg gtt cag tac cag cag cac agc cag gcc ctg ggg aag ttt ctt cag      342
Gly Val Gln Tyr Gln Gln His Ser Gln Ala Leu Gly Lys Phe Leu Gln
              90              95              100

gac atc ctc tgg gaa gag gcc aaa gag gcc cca gcc gac aag tga      387
Asp Ile Leu Trp Glu Glu Ala Lys Glu Ala Pro Ala Asp Lys
              105              110              115

tcgcccacaa gccttactca cctctctcta agtttagaag cgctcatctg gcttttcgct      447

tgcttctgca gcaactccca cgactgttgt acaagctcag gaggcgaata aatgttcaaa      507

ctgt                                                                511

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              Met Pro Ser Leu Gly

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| acc atg tgc agc ctg ctg ctc ttc agt gtg ctc tgg gtg gac ctg gcc | | | 102 |
| Thr Met Cys Ser Leu Leu Phe Ser Val Leu Trp Val Asp Leu Ala | | | |
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| atg gcg ggc tcc agc ttc cta agt ccc gaa cac cag aaa cta cag cag | | | 150 |
| Met Ala Gly Ser Ser Phe Leu Ser Pro Glu His Gln Lys Leu Gln Gln | | | |
| | 25 | 35 | |
| aga aag gag tcc aag aag ccg ccg gcc aaa ctg cag ccc cga gcc cta | | | 198 |
| Arg Lys Glu Ser Lys Lys Pro Pro Ala Lys Leu Gln Pro Arg Ala Leu | | | |
| | 40 | 50 | |
| gaa ggc tcc ctt ggc cca gaa gac aca agt caa gtg gaa gag gca gag | | | 246 |
| Glu Gly Ser Leu Gly Pro Glu Asp Thr Ser Gln Val Glu Glu Ala Glu | | | |
| | 55 | 65 | |
| gat gag ctg gaa atc cgg ttc aat gcc ccc ttt gat gtt gga atc aag | | | 294 |
| Asp Glu Leu Glu Ile Arg Phe Asn Ala Pro Phe Asp Val Gly Ile Lys | | | |
| | 70 | 80 | 85 |
| ctg tca ggg cct cag tac cac cag cat ggc cag gca ctc ggg aag ttt | | | 342 |
| Leu Ser Gly Pro Gln Tyr His Gln His Gly Gln Ala Leu Gly Lys Phe | | | |
| | 90 | 95 | 100 |
| ctt caa gag gtt ctt tgg gaa gac acc aac gag gcc ctg gca gac gag | | | 390 |
| Leu Gln Glu Val Leu Trp Glu Asp Thr Asn Glu Ala Leu Ala Asp Glu | | | |
| | 105 | 110 | 115 |
| tga tcatccacaa gatgggcctg cctgtttctcc cccaccccta gaagcactca | | | 443 |
| cctgactttt acactgtttc tgcagctact cccagttctg agtggtacta gttgaagagg | | | 503 |
| tgaataaaca ttcaaaccat aaaaaaaaaa aaaaaaaact cgag | | | 547 |

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 <211> 494
 <212> DNA
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 1 5 10

gtg ctc ctc atg gca gac ttg gcc atg gcg ggc tcc agc ttc ttg agc 98
 Val Leu Leu Met Ala Asp Leu Ala Met Ala Gly Ser Ser Phe Leu Ser
 15 20 25 30

ccc gaa cac cag aaa gtg cag cag aga aag gag tcc aag aag cca gca 146
 Pro Glu His Gln Lys Val Gln Gln Arg Lys Glu Ser Lys Lys Pro Ala
 35 40 45

gcc aaa ctg aag ccc cgg gcc ctg gaa ggc tgg ctc ggc cca gaa gac 194
 Ala Lys Leu Lys Pro Arg Ala Leu Glu Gly Trp Leu Gly Pro Glu Asp
 50 55 60

agt ggt gag gtg gaa ggc acg gag gac aag ctg gaa atc cgg ttc aac 242
 Ser Gly Glu Val Glu Gly Thr Glu Asp Lys Leu Glu Ile Arg Phe Asn
 65 70 75

gcc ccc tgt gat gtt ggg atc aag ttg tca ggg gct cag tcc gac cag 290
 Ala Pro Cys Asp Val Gly Ile Lys Leu Ser Gly Ala Gln Ser Asp Gln
 80 85 90

cac ggc cag ccc ctg ggg aaa ttt ctc cag gac atc ctc tgg gaa gag 338
 His Gly Gln Pro Leu Gly Lys Phe Leu Gln Asp Ile Leu Trp Glu Glu
 95 100 105 110

gtc act gag gcc ccg gcc gac aag tga ttgtccctga gaccagccac 385
 Val Thr Glu Ala Pro Ala Asp Lys
 115

ctctgttctc ccagcctcct aagggctcac ctggcttcca ggacgcttcc actatcacac 445

ccagctctga gggatgctag cctgggaggt gaataaacat tcagactgg 494

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 ctc tgc atg gac ttg gcc atg gcg ggc tcc agc ttt ctg agc ccc gaa 96
 Leu Cys Met Asp Leu Ala Met Ala Gly Ser Ser Phe Leu Ser Pro Glu
 20 25 30
 cat cag aaa ctg cag aga aag gaa gct aag aag cca tca ggc aga ctg 144
 His Gln Lys Leu Gln Arg Lys Glu Ala Lys Lys Pro Ser Gly Arg Leu
 35 40 45
 aag ccc cgg acc ctg gaa ggc cag ttt gac ccg gag gtg gga agt cag 192
 Lys Pro Arg Thr Leu Glu Gly Gln Phe Asp Pro Glu Val Gly Ser Gln
 50 55 60
 gcg gaa ggt gca gag gac gag ctg gaa atc cgg ttc aac gcc ccc ttt 240
 Ala Glu Gly Ala Glu Asp Glu Leu Glu Ile Arg Phe Asn Ala Pro Phe
 65 70 75
 aac att ggg atc aag cta gca ggg gct cag tcc ctc cag cat ggc cag 288
 Asn Ile Gly Ile Lys Leu Ala Gly Ala Gln Ser Leu Gln His Gly Gln
 80 85 90 95
 acg ttg ggg aag ttt ctt cag gac atc ctt tgg gaa gaa gct gaa gaa 336
 Thr Leu Gly Lys Phe Leu Gln Asp Ile Leu Trp Glu Glu Ala Glu Glu
 100 105 110
 acc ctg gct aac gag tga gtggccctgg gaccaaccac ctgtccgttc 384
 Thr Leu Ala Asn Glu
 115
 tcccaccctc agaagctctc acctggcttc cgggacaatt ccgagaccac gtggggctct 444
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 <211> 64
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Mature rat ghrelin with added epitopes

<400> 15

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu Leu Gly
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Ser Ser Phe Leu Ser Pro Glu His Gln Lys Ala Gln Gln Arg Lys Glu
 20 25 30

Ser Lys Lys Pro Pro Ala Lys Leu Gln Pro Arg Phe Asn Asn Phe Thr
 35 40 45

Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser Ala Ser His Leu Glu
 50 55 60

<210> 16
 <211> 68
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Mature ghrelin with added epitopes

<400> 17

Glu Glu Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys
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Val Ser Ala Ser His Leu Glu Gly Ser Ser Phe Leu Ser Pro Glu His
 20 25 30

Gln Lys Ala Gln Gln Arg Lys Glu Ser Lys Lys Pro Pro Ala Lys Leu
 35 40 45

Gln Pro Arg Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr
 50 55 60

Glu Leu Glu Glu
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<210> 17
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<212> PRT

<213> Artificial sequence

<220>

<223> Mature ghrelin with added epitopes

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Glu Glu Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu
1 5 10 15

Leu Gly Ser Ser Phe Leu Ser Pro Glu His Gln Lys Ala Gln Gln Arg
20 25 30

Lys Glu Ser Lys Lys Pro Pro Ala Lys Leu Gln Pro Arg Phe Asn Asn
35 40 45

Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser Ala Ser His
50 55 60

Leu Glu Glu Glu
65